CLAIMS

1.   A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining
5   current position information;

position information analysis means for analyzing said current position information received by the said position information reception means and calculating the current position;

10   map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position calculated by said position information
15   analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central processing means; and characterized in that
20   said central processing means has pedestrian history information comprising a reference direction α indicating the direction of a past movement route and a reference distance β indicating a prescribed distance, takes the current position at the start of navigation to
25   be reference point a0, and, upon receiving the current position ai after a prescribed time from said position information analysis means, calculates the distance

La0ai between said reference point a0 and said current
position ai, and when

$$\beta > La0ai \tag{1}$$

corrects said current position ai in the direction
5   of said reference direction α and calculates current
position display information, but when

$$\beta \leq La0ai \tag{2}$$

corrects said current position ai in the direction
of said reference direction α and calculates current
10   position display information, and in addition takes the
corrected position of said current position ai to be the
new reference point, and takes the direction from the
previous reference point a0 to the new reference point
to be the new reference direction α.

15   2.   A pedestrian navigation device for navigating
the route of a pedestrian, comprising:

        position information reception means for obtaining
current position information;

        position information analysis means for analyzing
20   said current position information received by the said
position information reception means and calculating the
current position;

        map information storage means for storing map
information;

25   central processing means for calculating current
position display information, based on said current
position calculated by said position information

analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central

5   processing means; and characterized in that

said central processing means receives the current position ai from said position information analysis means at prescribed intervals, and when the absolute value of the difference between the direction angle Ai

10   from the preceding current position ai-1 to the present current position ai and the reference angle A is such that

$$\alpha 0 \text{ (tolerance angle)} \ge |A-Ai| \qquad (3)$$

calculates current position display information

15   from said current position ai, and takes the direction angle Ai to be the new reference angle A.

3.   A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining

20   current position information;

position information analysis means for analyzing said current position information received by the said position information reception means and calculating the current position;

25   map information storage means for storing map information;

central processing means for calculating current

position display information, based on said current

position calculated by said position information

analysis means, and on said map information stored by

5   said map information storage means; and,

display means for displaying said current position

display information calculated by said central

processing means; and characterized in that

said central processing means takes the current

10   position at the start of navigation to be the reference

point a0, receives the current position ai at prescribed

intervals from said position information analysis means,

calculates the distance La0ai between said reference

point a0 and the current position ai, and when

15   β (reference distance) > La0ai   (4)

calculates current position display information

from said current position ai, but when

β (reference distance) $\leq$ La0ai   (5)

calculates current position display information

20   from said current position ai, and in addition takes

said current position ai to be the new reference point,

and takes the direction from the previous reference

point a0 to the new reference point ai to be the new

reference direction α.

25   4.   The pedestrian navigation device according to

Claim 3, characterized in that said central processing

means takes the current position at the start of

navigation to be the reference point a0, receives the

current position ai at prescribed intervals from said

position information analysis means, calculates the

distance La0ai between said reference point a0 and said

5   current position ai, and when

$$\beta \text{ (reference distance)} > La0ai \qquad (4)$$

calculates current position display information

from said current position ai, but when

$$\beta \text{ (reference distance)} \leq La0ai \qquad (5)$$

10   calculates current position display information

from said current position ai, and in addition takes the

current position a1 next calculated after said reference

point a0 to be the new reference point, and takes the

direction from the previous reference point a0 to said

15   current position ai to be the new reference direction α.

5.   A pedestrian navigation device for navigating

the route of a pedestrian, comprising:

position information reception means for obtaining

current position information;

20   position information analysis means for analyzing

said current position information received by the said

position information reception means and calculating the

current position;

map information storage means for storing map

25   information;

central processing means for calculating current

position display information, based on said current

position calculated by said position information
analysis means, and on said map information stored by
said map information storage means; and,

     display means for displaying said current position
5   display information calculated by said central
processing means; and characterized in that

     said central processing means has a reference
direction α indicating the direction of a past movement
route and a prescribed tolerance angle γ, takes the
10   current position at the start of navigation to be
reference point a_0, and, upon receiving the current
position a_i after a prescribed time from said position
information analysis means, calculates the direction
$a_0 \rightarrow a_i$ from said reference point a_0 to said current
15   position a_i, and

     (a) if the direction $a_0 \rightarrow a_i$ is outside the range of
the tolerance angle γ from the reference direction α,
uses current position display information calculated
using said reference point a_0 without modification; but
20   (b) if the direction $a_0 \rightarrow a_i$ is within the range of
the tolerance angle γ from the reference direction α,
calculates current position display information using
said current position a_i, and moreover takes the
corrected position of said current position a_i to be the
25   new reference point, and takes the direction from the
previous reference point a_0 to the new reference point
a_i to be the new reference direction α.

6.   A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

5   position information analysis means for analyzing said current position information received by the said position information reception means and calculating the current position;

map information storage means for storing map

10   information;

central processing means for calculating current position display information, based on said current position calculated by said position information analysis means, and on said map information stored by

15   said map information storage means;

display means for displaying said current position display information calculated by said central processing means; and,

direction measurement means for measuring the

20   direction of advance; and characterized in that

said central processing means takes the current position at the start of navigation to be reference point a0, and upon receiving the current position al after a prescribed time from said position information

25   analysis means, corrects said current position al in said direction of advance measured by said direction measurement means and calculates current position

display information, and in addition takes the corrected

position of said current position a1 to be the new

reference point.

7.   A pedestrian navigation device for navigating

5   the route of a pedestrian, comprising:

position information reception means for obtaining

current position information;

position information analysis means for analyzing

said current position information received by the said

10   position information reception means and calculating the

current position;

map information storage means for storing map

information;

central processing means for calculating current

15   position display information, based on said current

position calculated by said position information

analysis means, and on said map information stored by

said map information storage means;

display means for displaying said current position

20   display information calculated by said central

processing means; and,

direction measurement means for measuring the

direction of advance; and characterized in that

said central processing means takes the current

25   position at the start of navigation to be reference

point a0, and upon receiving the current position ai

after a prescribed time from said position information

analysis means, calculates the direction a0→ai from said

reference point a0 to said current position ai, and

(a) if the direction a0→ai is outside the range of

the tolerance angle γ from said direction of advance

5   measured by said direction measurement means, uses

current position display information calculated using

said reference point a0 without modification; but

(b) if the direction a0→ai is within the range of

the tolerance angle γ from said direction of advance

10   measured by said direction measurement means, calculates

current position display information using said current

position ai, and in addition takes the corrected

position of said current position ai to be the new

reference point.

15   8.   The pedestrian navigation device according to

Claim 6 or Claim 7, characterized in that said direction

measurement means is an electronic compass.

9.   The pedestrian navigation device according to

Claim 6 or Claim 7, characterized in that said direction

20   measurement means is a gyrosensor.

10.   The pedestrian navigation device according to

any one of Claims 1 through 7, characterized in that

said position information reception means obtains

current position information from a GPS (Global

25   Positioning System).

11.   A program for causing a portable terminal to

navigate a pedestrian route, which realizes in the

portable terminal the functions of the pedestrian

navigation devices according to any one of Claims 1

through 7.